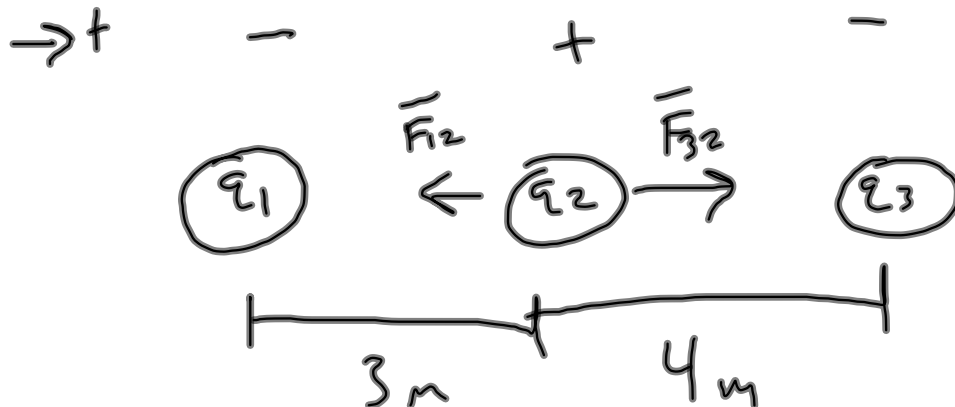


Electrostatics Practice Problems CP and Honors Physics

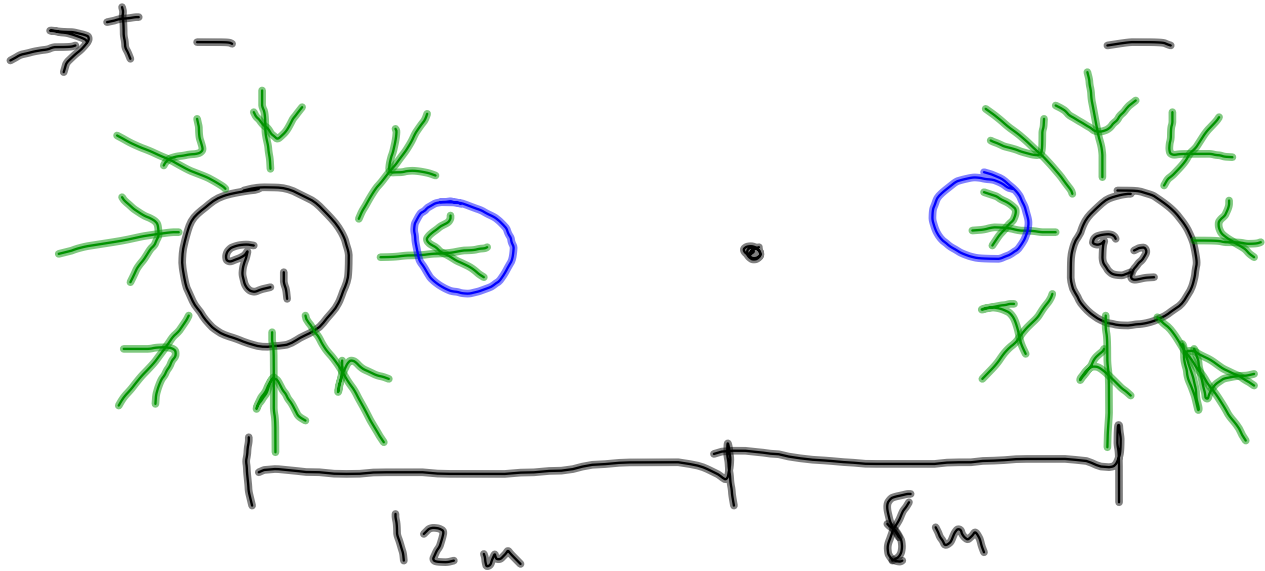
Three charges are placed in a line. The far left charge has a value of -50 microC, the middle charge has a value of 40 microC, and the far right charge has a value of -65 microC. The left and middle charges are separated by 3 m, and the right and middle charges are separated by 4 m. What is the net force on the middle charge?



$$\begin{aligned}\Sigma \vec{F} &= \vec{F}_{12} + \vec{F}_{32} \\ &= \frac{k|q_1||q_2|}{r_{12}^2} + \frac{k|q_3||q_2|}{r_{23}^2} \\ &= -1.998 \text{ N} + 1.461 \text{ N} \\ &= -0.537 \text{ N}\end{aligned}$$

Electrostatics Practice Problems CP and Honors Physics

Two charges and a point are placed on a line, and the point is between the charges. The left charge has a value of -90 microC and is 12 m from the point, and the right charge has a value of -55 microC and is 8 m from the point. What is the net electric field at the point?



$$\vec{E}_{\text{net}} = \vec{E}_1 + \vec{E}_2$$

$$= -\frac{k|q_1|}{r_1^2} + \frac{k|q_2|}{r_2^2}$$

$$= -5619 \text{ N/C} + 7726 \text{ N/C}$$

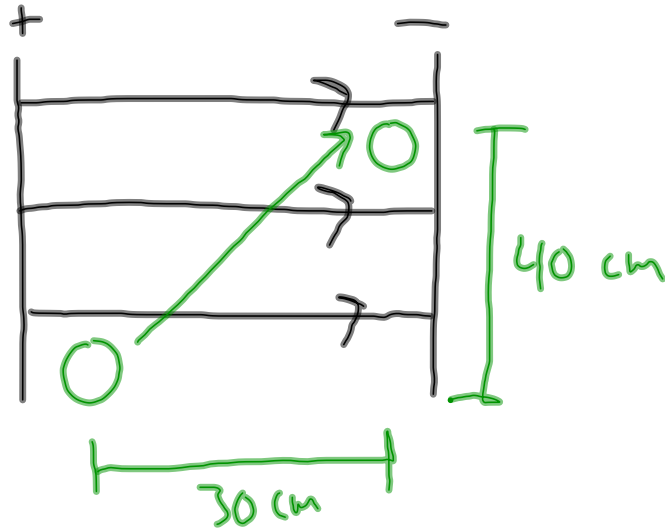
$$= 2107 \text{ N/C}$$

Electrostatics Practice Problems CP and Honors Physics

A uniform electric field with magnitude of 500 N/C pointing to the right is created between two parallel plates, and a charge with a value of -70 microC is placed in the field. It travels a displacement of 30 cm in the x-direction and 40 cm in the y-direction.

a) What is the change in electric potential energy of the charge?

b) What is the value of electric potential that exists over the displacement traveled by the charge?



$$\begin{aligned} \text{a) } \Delta U_e &= -qEd \\ &= -(-70 \times 10^{-6} \text{ C})(500 \text{ N/C})(0.30 \text{ m}) \\ &= 0.011 \text{ J} \end{aligned}$$

$$\begin{aligned} \text{b) } \Delta V &= -Ed \\ &= -(500 \text{ N/C})(0.30 \text{ m}) \\ &= -150 \text{ V} \end{aligned}$$